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Datasheet for the decision of 17 May 2018

Case Number: T 2036/13 - 3.4.02

Application Number: 09161993.2

Publication Number: 2259039

IPC: G01L9/00, G01L9/04

Language of the proceedings: EN

Title of invention:
A fibre optical system and use thereof

Applicant:
Simea Optic AB

Headword:

Relevant legal provisions:
EPÜ Art. 56
EPC R. 115(2)
RPBA Art. 13(1), 13(3), 15(3), 15(6)

Keyword:
Inventive step - main request (no)
Summons to oral proceedings - non-attendance of party
Late-filed auxiliary requests - admitted (no)

Decisions cited:
T 1587/07

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 2036/13 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 17 May 2018

Appellant: (Applicant)	Simea Optic AB Flottiljgatan 49 721 31 Västeräs (SE)
Representative:	Bjerkéns Patentbyrå KB (Gävle) Box 1274 801 37 Gävle (SE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 22 May 2013 refusing European patent application No. 09161993.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Bekkering
Members:	H. von Gronau
	T. Karamanli

Summary of Facts and Submissions

I. The appeal of the applicant is directed against the decision of the examining division to refuse the European patent application No. 09161993.2. The examining division refused the application on the ground that the subject-matter of independent claim 1 according to the main request did not involve an inventive step over document

D1: WO 2005/098385 A1

as closest prior-art document in combination with any of documents

D3: US 2008/0232745 A1,
D6: US 2008/0011087 A1, or
D11: N.A. RIZA ET AL: "Harsh environments minimally invasive optical sensor using free-space targeted single-crystal silicon carbide", IEEE SENSORS JOURNAL, vol. 6, no. 3, 1 June 2006 (2006-06-01), pages 672-685, XP055047013, ISSN: 1530-437X, DOI: 10.1109/JSEN.2006.874447,

and in combination with document

D2: WO 2005/024339 A.

Furthermore the examining division was of the opinion that the subject-matter of claim 1 of the main request did not involve an inventive step over document D2 in combination with document D3.

Concerning the subject-matter of claim 1 according to the auxiliary request underlying the contested decision the examining division concluded that it did not

involve an inventive step in view of document D1 in combination with documents D2, D3 and

D4: SE 510 449 C2,

or in view of document D2 in combination with documents D3 and D4.

II. With the notice of appeal, also comprising the grounds for appeal, the appellant filed a main request with an independent claim 1 comprising the features of originally filed claims 1 and 7, a first auxiliary request with claims corresponding to the claims of the main request underlying the contested decision and independent claim 1 comprising the features of originally filed claims 1, 3 and 5, and a second auxiliary request with claims corresponding to the claims of the auxiliary request underlying the contested decision and with an independent claim 1 comprising the features of originally filed claims 1, 3, 5 and 7. With letter dated 12 November 2013 the appellant filed in addition a new first auxiliary request with an independent claim 1 comprising the features of originally filed claims 1, 7 and 8, and stated that the first and second auxiliary requests filed with the appeal be renumbered as second and third auxiliary requests.

III. In a communication under Article 15(1) RPBA, annexed to the summons to oral proceedings, the board expressed its provisional opinion that the main request and first auxiliary request would not be admitted into the appeal proceedings according to Article 12(4) RPBA and Article 13(1) RPBA, respectively, because the independent claims of these requests were not further limited with respect to the independent claim of the main request or

the auxiliary request underlying the contested decision. They omitted the features of originally filed claims 3 and 5.
With respect to claim 1 of the second auxiliary request which corresponded to claim 1 of the main request underlying the contested decision the board expressed the provisional opinion that its subject-matter did not involve an inventive step in view of a combination of document D2 as closest prior art with any of documents D6, D3, or D11.

IV. With letter dated 16 April 2018 the appellant filed a new set of claims according to a main request corresponding to the claims of the then second auxiliary request. In addition the appellant filed new sets of claims according to first and second auxiliary requests, of which each claim 1 comprised an additional feature deriving solely from the description, and a new set of claims according to a third auxiliary request, of which claim 1 comprised both additional features introduced in claim 1 of the first and second auxiliary requests.

V. By letter dated 11 May 2018 the appellant informed the board that it would not be attending the oral proceedings.

VI. Oral proceedings were held on 17 May 2018. As it had announced, the duly summoned appellant did not attend. At the end of the oral proceedings, the chairman announced the board's decision.

VII. Claim 1 of the main request as filed with letter dated 16 April 2018 reads as follows:

"A fibre optical system for pressure measurement comprising
a pressure sensor (4) having at least two parallel partially reflecting surfaces (5, 7), one of which is arranged on a diaphragm (6) movable with respect to another fixed said surface as a consequence of pressure differences across said diaphragm, said surfaces are arranged so as to cause interference phenomena of light inciding substantially perpendicularly onto and reflected by the two surfaces (5, 7) depending upon the actual distance between these surfaces,
a light source (1) configured to emit light,
an optical fibre (3) configured to receive and transmit light from said light source to said pressure sensor in one direction and a measurement signal in the form of light reflected by said surfaces in the opposite direction, and
an arrangement (12) configured to receive said measurement signal and evaluate this signal so as to determine a value of a pressure at said diaphragm,
characterized in that said pressure sensor (4) is made of material being stable at a continuous temperature up to at least 800°C, that at least said diaphragm (6) of said sensor is made of SiC, that at least the part (23) of said optical fibre (3) connecting to said sensor is made of a material able to withstand a continuous temperature of at least 800°C,
that said pressure sensor (4) comprises a cavity (18) with a top surface (17) defining said fixed surface next to said optical fibre and a bottom (19) defined by said diaphragm (6) remote to said optical fibre,
that said cavity (18) has a channel-like opening (21) to a medium surrounding said pressure sensor (4), and
that said arrangement (12) is configured to determine a value of a dynamic pressure of said medium."

Claim 1 of the first auxiliary request comprises in comparison to claim 1 of the main request the additional feature "A" after the expression "characterized in" with the following wording:

"that said fixed surface (7) is formed on a part (17) of the pressure sensor being separated from the optical fibre (3), "

Claim 1 of the second auxiliary request comprises in comparison to claim 1 of the main request the additional feature "B" in the characterizing part of the claim so that the portion "that at least said diaphragm (6) of said sensor is made of SiC" reads "that at least said diaphragm (6) and a layer (17) forming said fixed surface (7) of said sensor are made of SiC".

Claim 1 of the third auxiliary request comprises in comparison to claim 1 of the main request the above mentioned additional features "A" and "B".

Reasons for the Decision

1. Non-appearance of the appellant at the oral proceedings

1.1 As announced in advance, the duly summoned appellant did not attend the oral proceedings. However, under Rule 115(2) EPC, the proceedings were allowed to continue in its absence.

According to Article 15(3) and (6) RPBA, the board shall "not be obliged to delay any step in the

proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned who may then be treated as relying only on its written case" and "ensure that each case is ready for decision at the conclusion of the oral proceedings, unless there are special reasons to the contrary."

Furthermore, the purpose of oral proceedings is to give the party the opportunity to present its case and to be heard. However, a party gives up that opportunity if it does not attend the oral proceedings. This view is supported by the explanatory note to Article 15(3) RPBA (former Article 11(3) RPBA) which reads: "This provision does not contradict the principle of the right to be heard pursuant to Article 113(1) EPC since that Article only affords the opportunity to be heard and, by absenting itself from the oral proceedings, a party gives up that opportunity" (see CA/133/02 dated 12 November 2002).

Moreover, the board agrees with the finding of the decision T 1587/07 that an appellant who submits amended claims as a new request after oral proceedings have been arranged but does not attend these proceedings must expect a decision not admitting the new request into the appeal proceedings pursuant to Article 13 RPBA in its absence (point 2.2 of the Reasons). For similar considerations as set out in said decision, the board takes the view that an appellant who presents new arguments after oral proceedings have been arranged but does not attend these proceedings must expect that the board decides that these arguments are not convincing.

1.2 In the present case, the main request and the first to third auxiliary requests were filed and new arguments regarding the disclosure of document D2 were presented

with the letter dated 16 April 2018, i. e. after the oral proceedings before the board had been arranged. The board did not find these new arguments convincing (see point 2.6) and did not admit the first to third auxiliary requests into the appeal proceedings (see point 3 below).

The appellant had to expect a discussion on the admission of the newly filed requests during the oral proceedings, in particular because reference had been made to Article 13 RPBA in the board's communication pursuant to Article 15(1) RPBA annexed to the summons to oral proceedings. By not attending the oral proceedings the appellant gave up the opportunity to present its case as to why the requests should be admitted into the appeal proceedings and could thus be treated as relying only on its written submissions. The appellant also had to expect a discussion on whether its new line of arguments was persuasive.

The board's decision not to accept the new arguments and not to admit the newly filed first to third auxiliary requests was therefore in conformity with the requirements of Article 113(1) EPC that the decisions of the EPO may only be based on grounds or evidence on which the parties concerned have had an opportunity to present their comments.

1.3 Accordingly, the case was ready for decision at the conclusion of the oral proceedings in accordance with Article 15(5) and (6) RPBA, and the voluntary absence of the appellant was not a reason for delaying a decision (Article 15(3) RPBA).

2. Main request - claim 1 - inventive step (Article 56 EPC)

2.1 Claim 1 corresponds to claim 1 of the main request underlying the contested decision. The examining division was inter alia of the opinion, that the subject-matter of claim 1 did not involve an inventive step starting from document D2 in combination with document D3, for instance.

2.2 The board is of the opinion that document D2 has to be regarded as the closest prior-art document. This document discloses a fibre optical system for pressure measurement (cf. title) comprising
a pressure sensor (tube 26) having at least two parallel partially reflecting surfaces (25, 28), one of which is arranged on a diaphragm (28) movable with respect to another fixed said surface as a consequence of pressure differences across said diaphragm, said surfaces are arranged so as to cause interference phenomena of light inciding substantially perpendicularly onto and reflected by the two surfaces depending upon the actual distance between these surfaces (cf. page 4, lines 7 - 14), the pressure sensor comprises a cavity (hollow tube 26) with a top surface defining the fixed surface 25 next to the optical fibre and a bottom defined by the diaphragm 28 remote from the optical fibre (cf. page 4, lines 7 - 14),
a light source configured to emit light,
an optical fibre (20) configured to receive and transmit light from said light source to said pressure sensor in one direction and a measurement signal in the form of light reflected by said surfaces in the opposite direction, and
an arrangement configured to receive said measurement signal and evaluate this signal so as to determine a

value of a pressure at said diaphragm (cf. page 6, lines 7 - 16),
the pressure sensor and optical fibre are made of a material being stable at a continuous temperature up to at least 800°C (cf. page 5, lines 7 - 14; sapphire provides high temperature stability up to 2000°C), the sensor and the fibre are made of sapphire,
the cavity of the sensor has a channel-like opening (33) to a medium surrounding said pressure sensor, and the arrangement is configured to determine a value of a dynamic pressure of the medium (cf. page 5, lines 29 - 31).

2.3 The subject-matter of claim 1 **differs** from the disclosure of document D2 in that at least the diaphragm of the sensor is made of SiC.

A sensor made of SiC provides the effect to be stable at a continuous temperature up to at least 800°C (cf. page 4, lines 14 - 21, of the original application). Since document D2 discloses already a material for the pressure sensor that is stable at a continuous temperature up to at least 800°C the **objective technical problem** starting from document D2 is therefore to find an alternative material for the pressure sensor that is stable at a continuous temperature up to at least 800°C.

2.4 The board agrees with the examining division in that silicon carbide is already used for high temperature pressure sensors in document D6 (cf. abstract), or D3 (cf. paragraph 0026, where it is disclosed that the diaphragm 30 may be selected from silicon carbide), or D11 (cf. page 673, 2nd and 3rd paragraph; SiC chips are used as Fabry-Perot cells at temperatures up to 1000°C). Therefore the use of SiC instead of sapphire

also for the diaphragm material is an obvious alternative which the person skilled in the art would consider. Since the Young-Modulus of sapphire and SiC are very similar it is obvious to replace sapphire by silicon carbide.

2.5 The appellant put forward that document D2 did not disclose a diaphragm made of SiC and that it was nowhere indicated that it would be preferred to combine a diaphragm of SiC with the channel-like opening of such a cavity for obtaining the measurement possibilities obtained by providing a fibre optical system according to claim 1. It would be an ex post facto analysis to assert that it would be obvious to a person of ordinary skill in the art to add the material feature of the diaphragm to the features known from D2 to arrive at the present invention.

In its letter dated 16 April 2018, the appellant further argued that document D2 disclosed an optical fibre pressure sensor, which meant that the optical fibre was included in the sensor and the end surface of the fibre formed the fixed light reflecting surface. Such a construction as disclosed in document D2 did not allow the required measurement accuracy because of the distance between the two surfaces and the quality of the end surface of the optical fibre. The present invention however was directed to "a fibre optical system for pressure measurement". Thus the fibre optical system included a pressure sensor and a separate optical fibre and it differed from the sensor disclosed in document D2 by the fact that the optical fibre did not form part of the sensor and that at least the diaphragm of the sensor was made of SiC.

2.6 The board does not agree with this line of argumentation. As explained above, document D2 discloses all features of claim 1 with the exception of the SiC material for the diaphragm. For a person skilled in the art it is obvious to look for alternative solutions. Therefore, the person skilled in the art would also look for an alternative material for sapphire that can withstand the high temperatures. Silicon carbide is known to withstand high temperatures and to be suitable for the diaphragm of a fibre optical pressure measurement system (cf. D3, paragraph 26). The person skilled in the art would therefore select without an inventive step silicon carbide as an alternative for sapphire in the sensor disclosed in document D2. The board cannot recognize any hindrance why the person skilled in the art should not try SiC in combination with the fibre optical system having a channel-like opening in the cavity as disclosed in document D2 and thus arrive at the claimed solution. Claim 1 defines a fibre optical system with an optical fibre and a pressure sensor comprising a cavity with a top surface defining said fixed surface next to said optical fibre and a bottom surface defined by said diaphragm remote from said optical fibre. The claim does not specify how the fixed surface is realized and the claim does not define that the pressure sensor and the optical fibre of the fibre optical system are separable or that the top surface of the cavity is not formed by the optical fibre material. The claim only requires that the top surface is next to the optical fibre. The board concludes therefore that document D2 discloses the defined pressure sensor, irrespective of an optional protection layer 50 (cf. D2, figure 6, page 8, line 29, to page 9, line 5).

2.7 The subject-matter of claim 1 therefore does not involve an inventive step over document D2 in combination with document D3.

3. First to third auxiliary requests - admission (Article 13(1) RPBA)

3.1 The new claims according to the first to third auxiliary requests were filed for the first time with the appellant's reply dated 16 April 2018, i.e. after the board's communication under Article 15(1) RPBA and one month before the oral proceedings. They thus constitute an amendment to the appellant's case after the grounds of appeal had been filed and may be admitted and considered at the board's discretion (Article 13(1) RPBA), this discretion being exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.

3.2 Moreover these new requests are an amendment to the appellant's case after oral proceedings had been arranged and thus, in accordance with Article 13(3) RPBA, they should not be admitted if they raise issues which the board could not reasonably be expected to deal with without adjournment of the oral proceedings. According to the consistent case law of the boards of appeal, if an additional search is needed to assess the patentability of claims amended with features from the description at such a late stage that either the oral proceedings must be adjourned or the case must be remitted to the department of first instance for further prosecution, Article 13(3) RPBA is against the admissibility of such claim requests (Case Law of the Boards of Appeal of the European Patent Office, 8th

edition, 2016, section IV.E.4.4.8 b)).

3.3 In the present case, independent claim 1 of the first to third auxiliary requests comprises, in addition to the features of claim 1 of the main request, features that were taken solely from the description. The appellant put forward that in the first auxiliary request the feature called A "that said fixed surface is formed on a part of the pressure sensor being separated from the optical fibre" had support in the documents originally filed throughout the description and in the figures, and explicitly on page 12, lines 11-13 of the description. Independent claim 1 of the second auxiliary request comprised the additional feature called B defining "that a layer forming said fixed surface of the sensor is made of SiC", which had support in the documents originally filed among others on page 10, lines 15-18 of the description. The third auxiliary request had an independent claim 1 comprising the additional features A and B.

The appellant did not explain why it did not file the first to third auxiliary requests at an earlier stage in the appeal proceedings. However, the board is of the view that these auxiliary requests could have been filed with the appellant's grounds of appeal since in the contested decision the examining division gave reasons why the disclosure of document D2 was relevant with respect to claim 1 of the then main request (cf. 3.1.2 of the contested decision). In addition, the board does not recognize any new reasoning presented for the first time in the board's communication under Article 15(1) RPBA justifying the filing of such requests only in response to the board's communication and not having permitted the appellant to file such requests at an earlier stage of the appeal proceedings.

Further, the board takes the view that the amendments to claim 1 of all three auxiliary requests introduce a fresh case, raising new issues and not dealing with other issues already raised by the examining division in the appealed decision or by the board. The newly introduced features derived solely from the description also raise the question of whether these features were included in the original search, or whether an additional search is necessary, since it cannot be automatically assumed that they were considered in the original search.

3.4 In view of the above, the board, exercising its discretion under Article 13(1) and (3)RPBA, decided not to admit the appellant's first to third auxiliary requests into the appeal proceedings.

4. The board comes to the conclusion that none of the appellant's requests can be allowed and that, therefore, the appeal must fail.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl R. Bekkering

Decision electronically authenticated